Design and Development of a Web-Based Internet Complaint Information System Using Rule-Based Method at PT. Integra Kreasitama Solusindo

Mardhiyah Fakhriyah *
Universitas Islam Negeri Sumatera Utara, Deli Serdang Regency, North Sumatra Province, Indonesia.

Rakhmat Kurniawan
Universitas Islam Negeri Sumatera Utara, Deli Serdang Regency, North Sumatra Province, Indonesia.

2024.

Abstract: This study focuses on developing an information system specifically designed to address issues related to service disruption complaints frequently encountered by PT Integra Kreasitama Solusindo customers. In an era marked by significant advancements in information technology, service companies must ensure that their customers can quickly and efficiently report any disruptions they experience. This research includes comprehensive system design steps, encompassing the creation of an intuitive user interface, developing a well-structured database, and modelling the overall system workflow. The primary objective of the developed information system is to facilitate the reporting of complaints, allow customers to monitor the progress of their complaints, and enable the support team to provide prompt and relevant responses. A rigorous testing methodology was employed during the development phase to ensure the system's performance and reliability. Evaluation results demonstrate that the system significantly optimizes the efficiency of managing service disruption complaints, resulting in faster response times. Additionally, the system enhances the overall management of customer service. This research underscores the importance of leveraging information technology to improve customer service quality, positioning PT Integra Kreasitama Solusindo as a competitive entity in the digital era. The findings of this research are expected to offer valuable insights for other companies facing similar challenges in managing customer complaints.

Keywords: Website; Service Interruption Complaints; Information Technology; CodeIgniter.

1. Introduction

The rapid development of information technology has influenced almost all aspects of human life, including the business world and customer service. In this era, service providers must ensure customers can access and use the service optimally. However, customers often need help with using the service. Complaints related to service disruptions have become common in various industrial sectors, including the information technology industry. Building and managing complaints efficiently and responsively is essential in maintaining customer satisfaction and creating a positive reputation for service providers. Therefore, a system is needed that can facilitate customers in reporting complaints, overseeing the development of their complaints, and ensuring the fast and accurate response of the support team.

PT Integra Kreasitama Solusindo, as one of the main actors in the information technology industry, is no exception from this challenge. This company is determined to provide superior services to its customers. To achieve this goal, PT Integra Kreasitama Solusindo requires information systems that can support the

management of complaints of disruption services efficiently and effectively. Herfandi *et al.* (2021) building information systems that can accommodate complaints from the Sumbawa University of Technology University Academic Civitas on online facilities with RWD (Responsive Web Design) and apply technology to resemble SPA (Single Page Application) and email notifications [1]. This information system is expected to be accessed by many devices with faster performance than non-SPA applications and email notifications; hoping it can be used for complaint management at Sarpras UTS.

Based on this thought, this study aims to develop an information system that can facilitate handling complaints of disruption service at PT Integra Kreasitama Solusindo. This system is expected to provide convenience for customers in reporting complaints, providing information about their complaint status, and enabling better management of overall customer service. The importance of the application of information technology in managing complaints of disturbance services has an impact on customer satisfaction and on increasing company operational efficiency [2]. Therefore, this research will explore the design, development and evaluation of information systems to provide significant benefits for PT Integra Kreasitama Solusindo and similar companies that face similar challenges in the current digital era. Based on the explanation above, the authors are interested in developing this concept with the topic of designing information system complaints about internet disorder services on PT Integra Kreasitama Solusindo customers. This study aims to investigate and implement a more efficient solution to overcome complaints of disruption of service faced by the company's customers.

The application of information technology in managing customer complaints has been proven to improve the efficiency and effectiveness of services in various sectors. Research conducted by Naomi *et al.* (2019) at Mercu Buana Kranggan University showed that a web-based complaint system could provide a more structured and responsive solution for handling student complaints [3]. This system allows students to submit online complaints managed by the admin and followed up by established procedures. This aligns with research by Sovia and Febio (2011), who developed e-library applications using HTML, PHP, and MySQL to facilitate digital library access and management. Implementing this web-based system only facilitates access to information and increases operational efficiency by automating various administrative processes [4].

Furthermore, the application of rule-based systems, as studied by Setiadi (2018) in determining the effectiveness of antibiotics to bacteria, shows that this approach can be widely applied in various applications, including in managing service complaints [5]. Rule-based systems use if-then logic to automate decisions based on existing data, thereby increasing the accuracy and speed of response. In customer service, this system can manage complaints more efficiently, ensuring each complaint is handled according to priority and urgency.

In its implementation, PT Integra Kreasitama Solusindo can adopt a similar approach to developing a web-based complaint information system that uses a rule-based system to automate complaint response. This system will allow customers to report service disruption through an easy-to-use online platform while the support team can monitor and handle the complaint in real-time. Research by Mandarani (2014) on monitoring temperature, humidity, and smoke using LAN networks shows that merging various technologies can produce a more comprehensive and responsive system of systems to user needs [6].

Considering previous research results, developing information system complaints of disruption service at PT Integra Kreasitama Solusindo is expected to have a significant positive impact. This system will increase customer satisfaction by providing more accessible and faster ways to report problems and improve the company's operational efficiency through more structured and responsive complaints. Implementing appropriate information technology in managing customer complaints can be a critical factor in maintaining the company's competitiveness in this digital era.

2. Research Method

This study uses the SDLC (System Development Life Cycle) approach to the Waterfall Model to design and develop information systems for complaints of internet disruption services for customers of PT. Integra Kreasitama Solusindo. The SDLC Waterfall model is a software development method that follows sequential and linear paths, similar to waterfalls. In this method, each phase must be completed before the next phase begins. Previous research has shown that the Waterfall model is more suitable for generic systems or software, where all system needs can be identified from the beginning with general specifications [7]. In addition, other research also confirmed the use of the Waterfall model in designing information systems, such as in software engineering [8]. The implementation of the Waterfall SDLC model has been proven successful in facilitating the operation of web -based information systems [9]. The stages in the waterfall model include needs analysis, system design, implementation, testing, and maintenance.

1) Analysis of needs (analysis)
   The analysis stage is the first step in the waterfall model where the system needs are collected from various stakeholders. This process involves identification and deep understanding of the problems to be solved by the system to be developed. At this stage, data collection is carried out through interviews, questionnaires, and observations to obtain complete and accurate information about user needs. The result of this stage is a need specifications that explain in detail the features and functions that must be possessed by the system.
2) Design
   After the system needs are collected, the next step is the system design. At this stage, a detailed design of various aspects of the system that includes the user-friendly and responsive user interface design is performed to make it easier for customers to use the system. Interface design must consider aspects of comfort and ease of use so that users can interact with the system effectively. In addition, the development of an efficient database structure is also carried out to store complaints information well. The database structure must be designed in such a way that the data can be accessed and managed easily and supports optimal system performance. Making optimal system workflows to handle complaints quickly and effectively is also an important part of this stage. The workflow must be designed to ensure that every complaint can be processed efficiently from reporting to settlement.
3) Implementation
   The implementation stage is the phase in which the design plan is converted into a real website form. At this stage, developers begin to build a system based on the design and data that have been collected previously. Implementation involves writing program codes using the appropriate programming language and development tools. The developer must ensure that each system component is developed in accordance with the specified design specifications. In addition, integration is also carried out between various system components to ensure that they can work well together. This stage also includes initial testing to detect and correct errors that may arise during the development process.
4) Testing
   Testing is a crucial stage in the waterfall model in which the system that has been built is tested thoroughly. Testing is carried out to verify that the system functions well according to the needs that have been previously set. This stage includes various types of testing such as unit testing, integration testing, system testing, and user accepting testing. Unit testing is carried out to ensure that each individual component of the system is functioning correctly. Integration testing aims to verify that various system components can work well together. System testing involves testing the overall system to ensure that all features and functions work according to specifications. User revenue testing is carried out to ensure that the system meets the needs and expectations of the user.
5) Maintenance
   Maintenance is the last stage in the waterfall model where the system that has been run is maintained regularly. Maintenance includes bug repair, performance improvement, and feature adjustments based on user feedback. This stage is important to ensure that the system continues to run well and can meet the needs of users optimally. Maintenance also includes monitoring system performance and handling of problems that may arise during the use of the system. In addition, the addition of new features or modification of existing features to meet the needs of users that develop over time.

2.2 System Development Method

The software development method used in this study is the Rule-Based System, which is one of the components in the expert system. Rule-based system is a computer program that processes specific information using a number of rules contained in basic knowledge, and uses inference engine to predict new information. This system stores programs in the form of if-then rules which function as problem solving procedures. Rule-based system consists of two main parts, namely antecedent and consequent. Previous studies have shown that the use of a rule-based system in an expert system can make a significant contribution in the diagnosis of disease [10]. In addition, other research also highlighted the use of a rule-based system in the development of a rule-based control and monitoring system [11]. The implementation of the Rule-based system has also been applied in the diagnosis of errors in the wind turbine, showing success in diagnosing problems in the complex mechanical system [12]. Rule-based system consists of two main parts, namely antecedent and consequent.

Antecedent: the part that expresses the situation or premise (the statement begins if).
Convequent: The part that states a certain action or conclusion that is applied if the situation or premise is true (statement begins then).

By using a rule-based system, it can increase output and productivity, be able to work with little or uncertain information, flexible, and improve the ability of problems-solving. The construction of a complaint service system is carried out with the designing of the plot of the model based on the rule-based method using a predetermined variable. Variables from the stages of needs are added to the rules of the rule-based system. The model is used to classify pages/pages that will be a candidate for making notifications and pop-up validation. The output of this model is in the form of a response page obtained by the admin in accordance with the system complaint rule. In making the model there are two variables that must be met by this system in order to display notifications and pop-up validation, namely complaints data from array read and flash-data so that the system is more leverage. The two variables will be used as rule (rule) to create a rule-based system. Based on observations of the system process that has been carried out, the following two rules are formulated:

If (page = internet) and (read = 1 (new data has entered)) then (redirect = internet response page). b. If (data = flash-data) and (found) then (pop-up validation).

The output of this model is to bring up notifications and pop-up validation that maximizes the system so that information is more efficient. The implementation of the Rule-Based System in the development of this system makes it possible to automate the response to customer complaints, ensuring that every complaint is handled quickly and precisely. This approach also allows the system to adapt to changes in needs and operational conditions, so that they can continue to provide optimal services to customers.

3. Result and Discussion

3.1 Results

3.1.1 Use Case Diagram

Use case diagram is a tool used to describe the interaction between actor and a modeled system. This diagram is important to understand how various stakeholders (actor) interact with the system to be developed. In the use case diagram developed for this internet disruption service complaint system, there are several main actors, namely "customers", "technician staff", and "administrator".

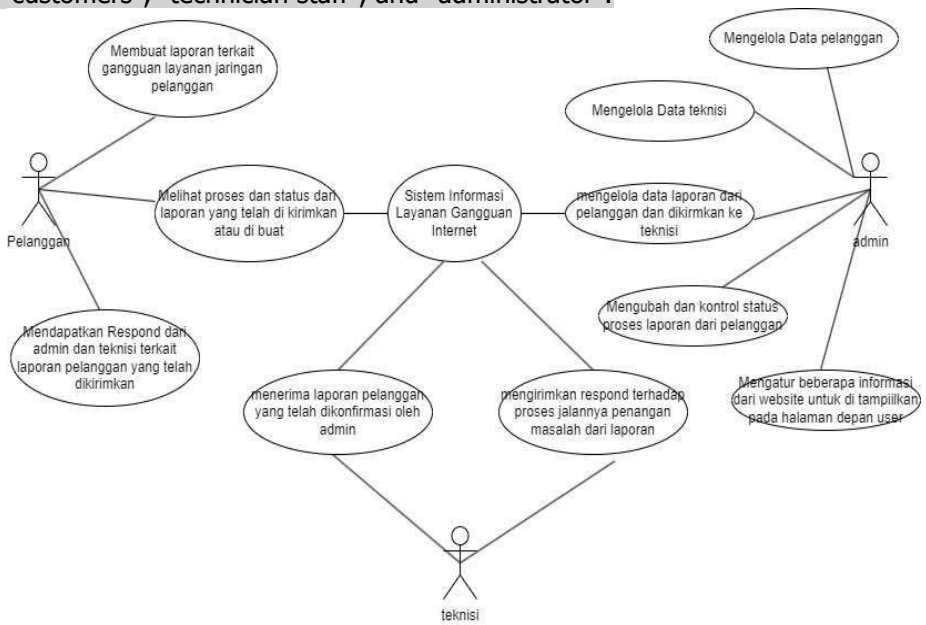
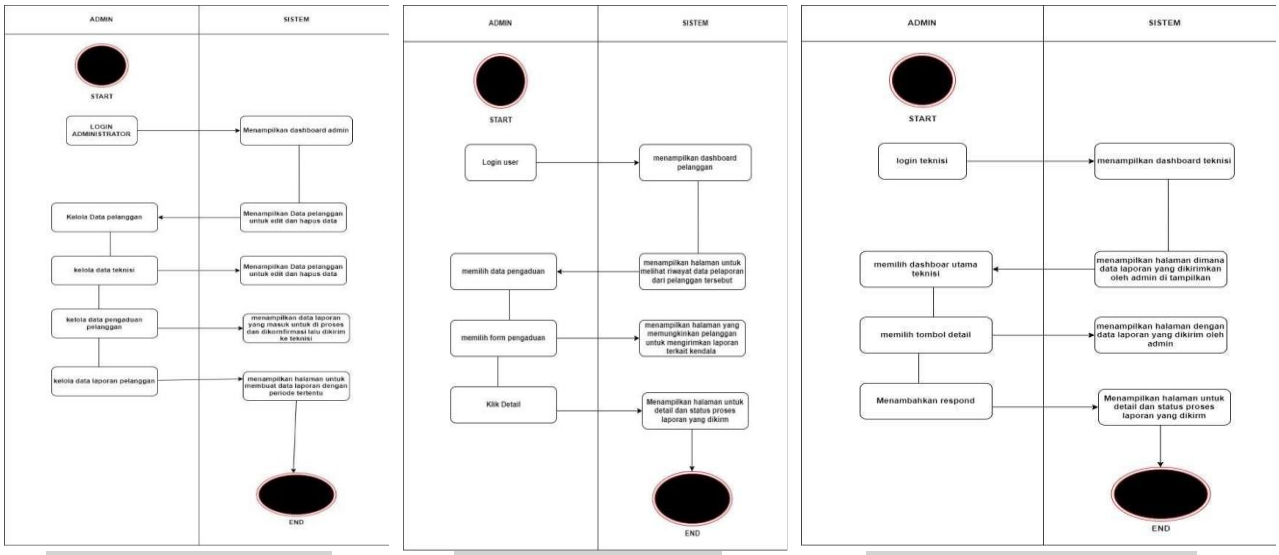

Membuat laporan terkait gangguan layanan jaringan pelanggan
Mengelola Data pelanggan
Mengelola Data teknisi
Pelanggan
Melihat proses dan status dari laporan yang telah di kirimkan atau di buat
Sistem Informasi Layanan Gangguan Internet
mengelola data laporan dari pelanggan dan dikirmkan ke teknisi
admin
Mengubah dan kontrol status proses laporan dari pelanggan
Mendapatkan Respond dari admin dan teknisi terkait laporan pelanggan yang telah dikirimkan
menerima laporan pelanggan yang telah dikonfirmasi oleh admin
mengirimkan respond terhadap proses jalannya penangan masalah dari laporan
Mengatur beberapa informasi dari website untuk di tampiilkan pada halaman depan user
teknisi

Figure 1. Use Case Diagram

Customers are actor who uses the system to report the service disruption they experience. The main use case associated with customers is "reporting disturbances". In this use case, customers can access the website and fill out the complaint form to report the interference they experience. This process is designed to be easily accessible and used by customers, so they can report disruptions quickly and efficiently. The technician staff are the actor responsible for handling incoming complaints. The main use case associated with technician staff is "Handling Complaints". In this use case, technician staff can see a list of incoming complaints, take complaints to be handled, and change the status of complaints in accordance with the progress of handling. This allows technician staff to manage their duties more effectively and ensure that each complaint is handled according to their priorities. Administrator is an actor responsible for managing the system as a whole. Use case associated with administrators is "managing the system". In this use case, administrators manage user information, complaints status, and see reports on complaints that have been handled. The administrator is also responsible for ensuring that the system is functioning properly and can be accessed by all entitled users. With this use case diagram, it can be seen the interaction between the actor and the use case in this internet disruption service complaint system, making it easier to understand system development.

3.1.2 Activity Diagram

Activity Diagram is another tool used in system design to describe the workflow of the process that occurs in the system. In this study, Activity Diagrams are used to illustrate the main processes in the internet disorder service complaint system using UML (Unified Modeling Language). This diagram includes a series of important steps in handling complaints, starting from reporting by customers to handling by technical staff. First, this diagram illustrates the steps in the "customer reporting process", starting from customer access to the website and filling out the complaint form. After the form is filled in, the complaint is sent to the system and the notification is sent to the Technical Staff. Furthermore, this diagram explains the process of "Technical Staff handling complaints", which begins with receiving complaints notifications by technical staff. The steps in this process include checking complaints information, determining the necessary improvement actions, and reporting status of handling to customers. Activity diagram also includes other processes such as "customers monitor the status of complaints", which allows customers to check the reported complaint status. In addition, this diagram also shows the process of "administrator to manage the system" which includes management of user data, complaints status, and making reports related to complaints that have been handled.


ADMIN
SISTEM
START
LOGIN ADMINISTRATOR
Menampilkan dashboard admin
Kelola Data pelanggan
Menampilkan Data pelanggan untuk edit dan hapus data
kelola data teknisi
Menampilkan Data pelanggan untuk edit dan hapus data
kelola data pengaduan pelanggan
menampilkan data laporan yang masuk untuk di proses dan dikonfirmasi lalu dikirim ke teknisi
kelola data laporan pelanggan
menampilkan halaman untuk membuat data laporan dengan periode tertentu
END
ADMIN
SISTEM
START
Login user
menampilkan dashboard pelanggan
memilih data pengaduan
menampilkan halaman untuk melihat riwayat data pelaporan dari pelanggan tersebut
memilih form pengaduan
menampilkan halaman yang memungkinkan pelanggan untuk mengirimkan laporan terkait kendala
Klik Detail
Menampilkan halaman untuk detail dan status proses laporan yang dikirim
END
ADMIN
SISTEM
START
login teknisi
menampilkan dashboard teknisi
memilih dashboar utama teknisi
menampilkan halaman dimana data laporan yang dikirimkan oleh admin di tampilkan
memilih tombol detail
menampilkan halaman dengan data laporan yang dikirim oleh admin
Menambahkan respond
Menampilkan halaman untuk detail dan status proses laporan yang dikirim
END

(a) Activity Diagram Admin (b) Activity Diagram User (c) Activity Diagram Technician

Figure 2. Activity Diagram Admin, User, and Technician

By using the Activity Diagram, the workflow in the system can be clearly visualized, making it easier for developers to understand and design an effective and efficient system.

3.1.3 System Development Method

Rule-based system implementation is used to maximize the complaint service system made. Rule-based systems are an approach that uses if-internet logic rules to process information and make decisions. In the context of this complaint system, the Rule-Based System is used to automate the response to incoming complaints. In this complaint service system, there are three choices provided so that users can choose the

type of complaint that will be complained of, namely the internet, LCD, and the system in the PTIK UPT. The information data obtained from the user complaint process and the response from the admin is then translated into the IF-THEN rules so that it can be accepted in making a complaint service system as a reference or rule in making message notifications and pop-up validation. Some of the applicable if-then rules are as follows:

Message notification:
If (page = internet) and (read = 1) then (redirect = internet response page).
If (page = lcd) and (read = 1) then (redirect = LCD response page).
If (page = system) and (read = 1) then (redirect = system response page).

In the IF-THEN rules above, it is shown that when the user has finished inputting complaints and has been read (meaning there is a new data that enters), then if the notification is clicked, the user will enter the page to respond to complaint data.

Pop-up Validation:
If (data = flash-data) and (found) then (pop-up validation).

In the IF-THEN rules above, it is shown that when the user is finished making complaints and there are flashs found, pop-up validation will appear.

3.1.4 Implementation of Complaints Information Systems

The implementation of complaints information systems involves several important steps that ensure that the system functions well and meets the needs of users. Here are some of the implementation stages carried out:

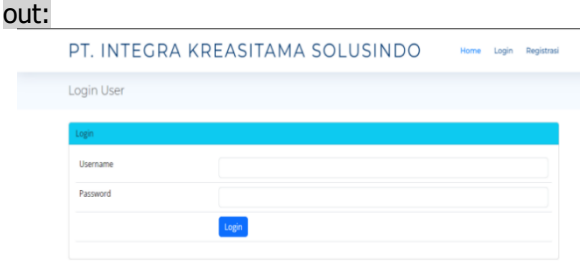


Figure 3. User login page

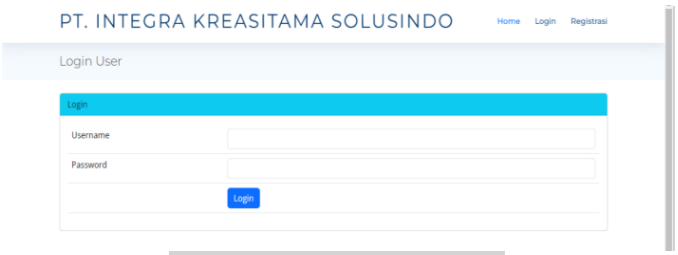


Figure 4. User Register page

On the login page, an evaluation is conducted to verify the performance of the user interface (UI) on the Login Phase of the Internet Disorders Complaint System PT. Integra Kreasitama Solusindo. This evaluation ensures that the login page is easy to use and can be accessed by all entitled users. On the register page, an evaluation is carried out to ensure that the user interface (UI) on the registration page of the internet disruption service complaint system PT. Integra Kreasitama Solusindo runs well and meets predetermined standards. This is important to ensure that the registration process runs smoothly and user data is stored safely.

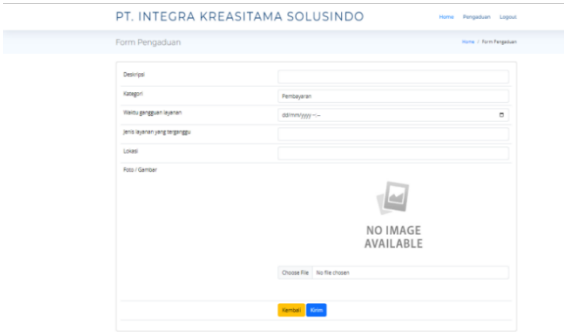


Figure 5. Complaints Data page

Figure 6. User Dashboard Page

This test includes checking various interface elements, including input validation, layout of form elements, and responses from the form when the user fills in complaints information. Testing also includes whether the report can be received by the admin and whether the user can see the report data that has been created and entered into the system. The purpose of testing on the user dashboard page is to ensure that the user interface (UI)

on the dashboard runs well and in accordance with the user's needs. On this user dashboard page, report data that has been entered to the report data that has been completed clearly.

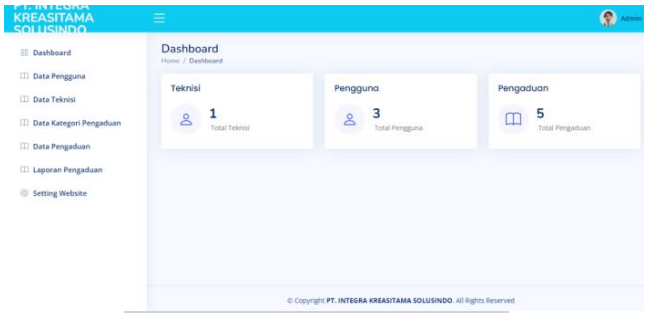


Figure 7. Admin dashboard page

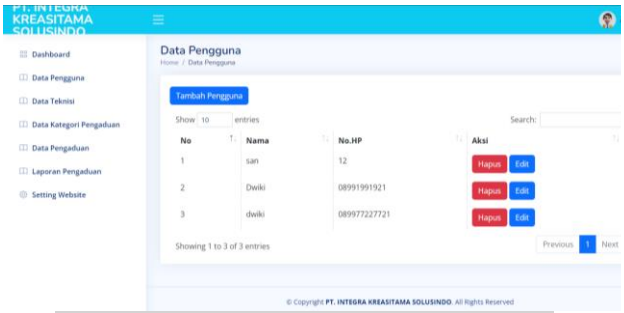


Figure 8. Admin Phase User Data Features

This test includes verification of the main feature functionality on the dashboard page, such as seeing the status of complaints, handling complaints, managing customer and technician data, and producing complaints reports. Evaluation is carried out to ensure that all features function according to specifications and can be easily accessed by the administrator. This test includes the user interface responsiveness test on various devices and screen sizes. This is done to ensure that user data features can be accessed and used well from various devices, including desktops and laptops. This test ensures that user data can be managed efficiently and safely.

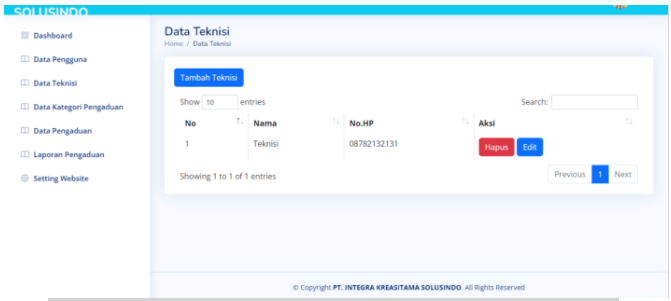


Figure 9. Admin Phase Technician Data Features

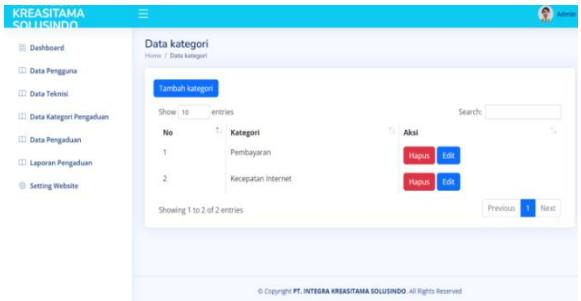


Figure 10. Admin Phase Category Data Features

The technician data feature on the admin page aims to ensure that this feature is functioning properly, as needed, and provides optimal user experience for the administrator. Testing involves verification of various functions in technician data features, such as adding, editing, deleting technician data, as well as searching and data filters. It is important to ensure that technician data can be managed properly and support system operations. The category data feature on the admin page involves verification of various functions in the complaint category data feature, such as adding, editing, deleting the complaint category, as well as searching and filtering data. The test also includes data validation to ensure that the data entered by the administrator is in accordance with the expected format and can be stored correctly in the database.

Figure 11. Admin Phase Complaints Data Features

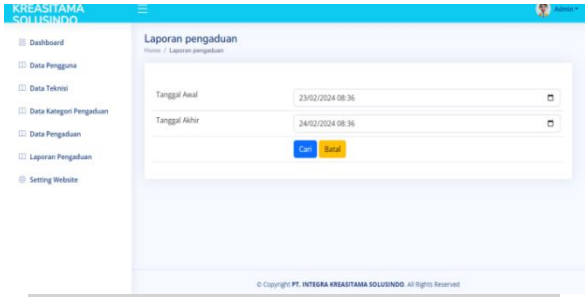


Figure 12. Admin Report Recap Feature Page

The complaint data feature on the admin page is the place where the report sent by the customer is processed. The admin confirms and checks the data received, such as ensuring the username is registered in the customer database. After the admin confirms the suitability of the data received, the data is sent to the technician for further handling in the field. By clicking the process button, the data is automatically sent to the technician

and displayed on the complaint data page on the technician dashboard. The interface testing of the admin page on the report recap feature is carried out to ensure that the interface provided to the system administrator meets the functional and non-functional needs that have been determined. This feature allows the admin to display report recap data which can then be sent in PDF form. This test ensures that the report recap feature can be accessed easily and produces accurate reports.

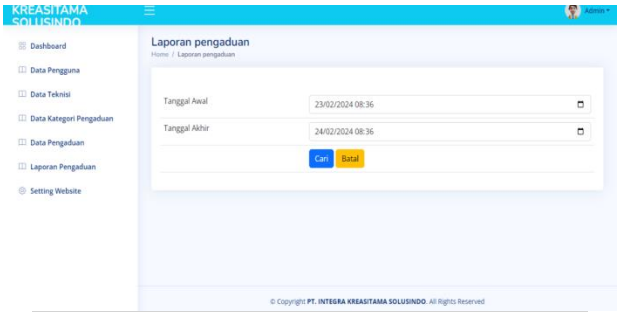


Figure 13. Admin Phase Report Recap Features

The pages are finished the technician involves evaluating the appearance of the technician page, ease of use, responsiveness, and design consistency. Display evaluation includes checking layout, color consistency, fonts, and other design elements, as well as the clarity of the appearance of important elements such as the task list, task details, and action buttons. Responsiveness is tested by ensuring the appearance of technician pages can adjust to various devices. The test was also carried out to ensure that the data sent by the admin to the technician can be received and displayed in the report data that will be completed by the technician on the technician dashboard. Through this series of tests, the information system complaint information system developed can certainly function properly and meet user needs. The implementation of the Rule-Based System in developing this system allows the management of complaints that are more efficient and responsive, thereby increasing customer satisfaction and operational efficiency of the company.

3.2 Discussion

This research succeeded in developing and implementing a web -based internet disorder service information system for PT. Integra Kreasitama Solusindo. Through various stages in the Waterfall SDLC (System Development Life Cycle) model, from needs analysis to maintenance, this system is designed to optimize the reporting and handling of service disruption by customers, technicians, and administrators.

At the needs analysis stage, various needs of stakeholders were successfully identified and collected. Data collected through interviews, questionnaires, and observations provide a clear picture of the problems faced by customers and technician technical needs. Identification of these needs is an important basis in the design of systems in accordance with expectations and real needs in the field. The results of this analysis indicate that customers need a system that is easily accessible and used to report disturbances, while technicians need tools to manage and follow up on complaints efficiently.

In the design stage, various technical aspects of the system are designed in detail. User-friendly and responsive user interface design ensures that customers can easily access and use the system. Efficient database structure is designed to store complaints information well, so that data can be accessed and managed easily. The system workflow is also designed to ensure that each complaint can be processed quickly and effectively, from reporting by customers to completion by technicians. Making a use case and activity diagram helps in the overall visualization and understanding of the system workflow, ensuring that every step in the complaint process is handled properly.

At the implementation stage, the design that has been designed is converted into a real website form. The use of proper programming languages and development tools ensures that the system is built in accordance with the specified specifications. Integration between various system components is carried out carefully to ensure that everything can work together well. Rule-based system implementation allows more efficient and automatic complaints management. IF-THEN rules applied in the system help in automatic decision making, such as directing complaints to the right pages or giving rise to pop-up validation. This increases the responsiveness and efficiency of the system in handling complaints.

Comprehensive testing is carried out to ensure that the system functions well and meets the needs of the user. Unit testing, integration, system, and user acceptance are carried out thoroughly. Unit testing ensures that each individual component of the system functions correctly. Integration testing verifies that various system components can work well together. System testing tests the whole system to ensure that all features

and functions work according to specifications. User revenue testing ensures that the system meets user needs and expectations. The test results show that this system is able to handle complaints quickly and efficiently, and provide appropriate feedback to users.

The maintenance phase ensures that the system that has been run is maintained regularly to maintain its performance. Maintenance includes bug repair, performance improvement, and feature adjustments based on user feedback. This process is important to ensure that the system continues to run well and can meet the needs of users optimally. Continuous system performance monitoring and handling of problems that arise helps in maintaining the reliability and efficiency of the system.

The evaluation of the developed system shows that the information system for internet disorder services complaints has a significant positive impact on PT. Integra Kreasitama Solusindo. This system makes it easy for customers to report service disruption and monitor their complaints status. Technicians can manage and follow up on complaints more efficiently, while administrators have effective tools to manage the system as a whole. Rule-based system implementation has proven to be effective in increasing system efficiency and responsiveness. This system also allows PT. Integra Kreasitama Solusindo to improve the quality of customer service and strengthen its position as a competitive service provider in the digital age.

4. Related Work

Research related to the development of web -based service complaints information systems has been carried out by various previous researchers, providing a strong foundation for further development in this field. The following are some related studies that are a reference in developing information systems for complaints of internet disruption services at PT. Integra Kreasitama Solusindo, as well as comparative analysis with the findings of this research. Research conducted by Naomi *et al*. (2019) at Mercu Buana Kranggan University developed a web -based complaint system for students. This system allows students to submit online complaints, which are then managed by the admin to be followed up in accordance with established procedures [3]. The findings of this study indicate that a web -based complaint system can provide a more structured and responsive solution in handling student complaints. The similarity with this research lies in the use of web -based platforms to facilitate complaints. However, this research focuses on the academic environment, while our research focuses on internet disruption services in the commercial sector.

Sovia and Febio (2011) developed e-library applications using HTML, PHP, and MySQL to facilitate library access and management digitally. This web -based system implementation increases operational efficiency through the automation of various administrative processes [4]. Although the focus of the research is different, namely in e-library, the principles of design and web development applied in their research are very relevant and applied in the development of a service complaint system in this study. Setiadi (2018) applies a rule-based system to determine the effectiveness of antibiotics to bacteria in the 3D adventure of antib games. Rule-based system uses if-then logic to automate decisions based on existing data, which increases accuracy and response speed [5]. This research is relevant because our research also applies a rule-based system to manage service complaints automatically, improve system efficiency and responsiveness. Research by Mandarani (2014) Developing a temperature monitoring system, humidity, and smoke using a LAN network, which allows monitoring of environmental conditions in real-time and provides notifications in the event of anomalies. Although the context is different, this research shows how the integration of network technology and sensors can be applied to increase responsiveness [6], which is also applied in our research for service complaints notifications. Rakhmawati *et al*. (2018) Developing the Rule-Based System Method to determine the priority of taking goods by city transportation [13]. This implementation helps optimize the process of taking orders based on various predetermined parameters. Equality with our research is the use of a rule-based system for efficient decision making, but the focus of the application in this study is on logistics, while our research on customer service complaints.

Research by Bayu Putra *et al*. (2019) Developing a website -based public complaint application at the Palopo Daily Office, which allows the public to apply for complaints online. This study shows that web -based complaints applications can increase public participation in reporting problems and accelerate the complaint handling process. Our research has similarities in terms of increasing accessibility and user participation in complaints, but applied in commercial internet services [14]. Ibrahim and Maita (2017) developed a web -based public service information system at the Kampar Regency Public Works Office. This system is designed to increase transparency and efficiency in managing public services [15]. This implementation shows how information technology can be used to improve the quality of public services, which is in line with our research objectives in improving the quality of customer service of PT. Integra Kreasitama Solusindo. Research by

Wimdarto *et al*. (2014) Developing a rule-based expert system for the automation of the preparation of the Instructor credit score, using IF-THEN logic to automate the assessment process. This rule-based approach is relevant to our research that uses a rule-based system for response automation and handling service complaints [16].

Nugroho *et al*. (2019) and Iklila and Masnur (2021) developed a web -based job vacancy information system to facilitate job seekers in finding appropriate vacancies and companies in publishing job vacancies. Although the focus is different, the principles of web-based information system design that are efficient and easy to use are also applied in our research [17][18]. Research by Simatupang and Erica (2021) developed a web -based job portal information system at BPJS Employment, facilitating job seekers to access vacancies and applying for job information online [19]. This study shows how web -based information systems can increase accessibility and efficiency, principles that are also applied in the development of our service complaint system. Lesmana *et al*. (2020) Developing a web -based job information system that simplifies the process of searching for job vacancies [20]. This implementation shows how information technology can overcome the problems encountered in the job search process, which is relevant to our efforts to overcome the problem of service complaints.

Previous research shows that the development of web -based service complaints information systems is an important and relevant research area. This study utilizes the concepts applied in previous studies, such as the use of a rule-based system, user-friendly user interface design, and network technology integration for real-time notifications. However, this research is different in terms of application focus, namely in complaints of internet disruption services in the commercial sector, with the aim of improving the quality of customer service and operational efficiency of PT. Integra Kreasitama Solusindo. Through the adoption and development of these concepts, this research is expected to make a significant contribution in the field of service complaints and the development of web-based information systems.

5. Conclusion

Research has succeeded in developing and implementing a web -based internet disorder service information system for PT. Integra Kreasitama Solusindo. Through the implementation of the SDLC Waterfall model consisting of the needs of needs, system design, implementation, testing, and maintenance, this system is designed to optimize the reporting and handling of service disturbances by customers, technicians, and administrators. The results showed that the information system developed was able to increase efficiency and effectiveness in the management of complaints from internet disruption services. This system makes it easier for customers to report service disturbances through online and responsive online platforms. Customers can easily report disturbances, monitor their complaints status, and receive rapid and relevant responses from the support team.

The implementation of the Rule-based system in the development of this system has proven to be effective in automating the complaint management process. With IF-THEN logic, the system can provide notification and pop-up validation automatically, which allows complaints management to be carried out more efficiently and responsively. Technicians can manage and follow up on complaints more efficiently, while administrators have effective tools to manage user information, complaints status, and make reports. Comprehensive testing ensures that the system functions well and meets user needs. Unit testing, integration, system, and acceptance of users show that this system is able to handle complaints quickly and efficiently, and provide appropriate feedback to the user. System maintenance is carried out routinely to ensure that the system continues to run well and can meet the needs of users optimally. Continuous system performance monitoring and handling of problems that arise helps in maintaining the reliability and efficiency of the system.

This study shows that the application of appropriate information technology can have a significant positive impact in managing service complaints. The developed internet disruption service complaint information system has succeeded in improving the quality of customer service and operational efficiency of PT. Integra Kreasitama Solusindo. These results indicate that information technology can be used effectively to overcome problems in customer service management, increase customer satisfaction, and strengthen company competitiveness in the digital age. This research also contributes significantly in the field of information system development, especially in the context of service complaints management. The implementation of the Rule-based system in the complaint system shows how this technology can be used to improve operational efficiency and quality of customer service. The use of the SDLC Waterfall model ensures that each stage of the development process is carried out carefully and systematically, produces a reliable system and in accordance with user needs.

For further research, it is recommended to explore further the use of other technologies such as artificial intelligence (AI) and machine learning to further enhance efficiency and accuracy in complaints management. In addition, the implementation of additional features such as complaints data analysis to identify general trends and patterns can help companies in making better and proactive decisions in improving service quality. This research is expected to provide useful insights for the development of future service complaints information systems, as well as providing guidance for other companies that face similar challenges in managing customer complaints.

References

[1] Herfandi, H., Yuliadi, Y., Abdillah, S. N., & Susanto, E. S. (2021). Rancang Bangun Sistem Informasi Pengaduan Layanan Sarpras Di Universitas Teknologi Sumbawa Berbasis Web. *Jurnal Informatika Teknologi dan Sains*, *3*(1), 308-315. https://dx.doi.org/10.51401/jinteks.v3i1.984.

[2] Fawadhil, F., & Ramadhani, S. (2020). Rancang bangun sistem informasi pengaduan layanan teknis bidang teknologi informasi dan komunikasi. In *Seminar Nasional Teknologi Informasi Komunikasi dan Industri* (p. 100).

[3] Naomi, M. (2019). Analisa Dan Perancangan Sistem Pengaduan Mahasiswa Berbasis Web (Studi Kasus: Universitas Mercu Buana Kranggan). *JUSIBI (Jurnal Sistem Informasi dan Bisnis)*, *1*(5), 185-193. https://doi.org/10.54650/jusibi.v1i5.172.

[4] Sovia, R., & Febio, J. (2011). Membangun aplikasi e-library menggunakan html, php script, dan mysql database. *Jurnal Processor*, *6*(2), 38-54.

[5] Setiadi, W. (2018). Implementasi rule-based system untuk menentukan efektivitas antibiotik terhadap bakteri pada game 3D Adventure of Antib. *Высшей Нервной Деятельности*, 2, 22-249.

[6] Mandarani, P. (2014). Perancangan dan implementasi user interface berbasis web untuk monitoring suhu, kelembaban dan asap pada ruangan berbeda dengan memanfaatkan jaringan local area network. *J. TEKNOIF*, 2(2), 37-42. https://doi.org/10.21063/jtif.2014.V2.2.37-42

[7] Susanto, R. and Andriana, A. (2016). Perbandingan model waterfall dan prototyping untuk pengembangan sistem informasi. Majalah Ilmiah Unikom, 14(1). https://doi.org/10.34010/miu.v14i1.174

[8] Saputra, W. (2024). Rekayasa perangkat lunak pemesanan jasa cetak pada percetakan baja. Reputasi Jurnal Rekayasa Perangkat Lunak, 5(1), 57-61. https://doi.org/10.31294/reputasi.v5i1.3215

[9] Nugroho, A. (2019). Rancang bangun sistem informasi manajemen surat tugas berbasis web menggunakan waterfall model. Jurnal Informatika Jurnal Pengembangan It, 4(2), 146-151. https://doi.org/10.30591/jpit.v4i2.1382

[10] Farahani, F., Zarandi, M., & Ahmadi, A. (2015). Fuzzy rule based expert system for diagnosis of lung cancer.. https://doi.org/10.1109/nafips-wconsc.2015.7284206

[11] Nalepa, G. and Ligęza, A. (2010). The hekate methodology. hybrid engineering of intelligent systems. International Journal of Applied Mathematics and Computer Science, 20(1), 35-53. https://doi.org/10.2478/v10006-010-0003-9

[12] Wei-guo, Y. and Jiang, D. (2015). Wind turbine fault diagnosis system based on a fuzzy expert system.. https://doi.org/10.2991/ipemec-15.2015.98

[13] Rakhmawati, N. A., Budi, A. S., Altetiko, F. J., Ramadhani, F., Wardati, N. K., & Hindrayani, K. M. (2018). Penentuan prioritas pengambilan pesanan barang oleh angkutan kota dengan metode rule-based system. *J. Sistem Informasi dan Bisnis*, 8(2), 195. https://doi.org/10.21456/vol8iss2pp195-202

[14] Bayu Putra, E., *et al*. (2019). Aplikasi pengaduan masyarakat berbasis website pada Kantor Harian Palopo. *J. Chem. Inform. Model.*, 8(1), 161-172. Retrieved from http://j-ptiik.ub.ac.id

[15] Ibrahim, W. H., & Maita, I. (2023). Sistem Informasi Pelayanan Publik Berbasis Web Pada Dinas Pekerjaan Umum Kabupaten Kampar. *Jurnal Ilmiah Rekayasa Dan Manajemen Sistem Informasi*, 3(2), 17-22.

[16] Wimdarto, C., Nugroho, H. A., & Hidayah, I. (2014). Sistem pakar berbasis aturan untuk otomatisasi penyusunan angka kredit instruktur berbasis web. *J. Penelitian Komunikasi, Informasi, dan Media Massa*, 17(2), 71-80.

[17] Nugroho, D. A., Zulfikar, & Sujono. (2019). Sistem informasi lowongan pekerjaan berbasis web. *Epic: Exact Papers in Compilation*, 1(2), 87-94.

[18] Iklila, D., & Masnur. (2021). Sistem informasi penyedia lowongan kerja berbasis web. *Jsilog: Jurnal Sintaks Logika*, 1(2). https://doi.org/10.31850/jsilog.v1i2.813

[19] Simatupang, J., & Erica, S. H. (2021). Implementasi sistem informasi job portal pada BPJS Ketenagakerjaan berbasis web. *JIT: Jurnal Intra Tech*, 5(2). https://doi.org/10.37030/jit.v5i2

[20] Lesmana, L. S., Putra, F., & Yandani, E. S. (2020). Rancang bangun sistem informasi lowongan kerja berbasis web. *Jitika: Jurnal Ilmiah Teknologi Informasi Asia*, 14(2), 2580-8397. https://doi.org/10.32815/jitika.v14i2.454.